

READR/SAVER Utility

Reference Manual



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PRINTING HISTORY

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Preface

This manual describes the READR/SAVER backup utility package. The package can be used as a means to distribute software updates, or to backup and restore your own files.

Chapter 1 Introduction. Overview of the READR/SAVER package; system requirements.

Chapter 2 Using READR. READR operations; commands and examples.

Chapter 3 Using SAVER. SAVER operations; commands and examples.

Chapter 4 Updating the System Disc. What to do with your software updates on minicartridge.

Chapter 5 Loading READR and SAVER.

Appendix A Error Messages.

Appendix B Advanced User and Application Notes.

NOTE

All references to RTE pertain to RTE-IVB and RTE-6/VM. Specific differences pertaining to the operating systems are clearly noted throughout this manual.

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Chapter 1

Introduction

Overview

The READR/SAVER package is a pair of file backup and restore utilities. The SAVER program saves disc files onto magnetic tape or minicartridge in a packed format. The READR program reads files from magnetic tape or minicartridge and places them on disc.

Another main feature of the READR/SAVER package is its flexibility in saving and restoring files selectively.

SAVER creates a file-name table of the files to be saved. It writes the file-name table on tape as a directory. SAVER then opens each file in turn, writes it to the tape, and verifies the file by comparing the tape data bit by bit to the disc data. Optionally, the directory may be sorted so that files are easier to find. The directory is the first file on tape and is in File Manager format. It can be accessed with a FMGR ST or DU command.

READR allows you to selectively choose which files on tape are to be placed on disc. An option to update your disc files is also included. If a file already exists on disc, and the update option is selected, the disc file will be replaced by the file on tape. The tape file will be verified before actual replacement takes place.

System Requirements

READR and SAVER execute only on RTE-IVB and RTE-6/VM operating systems. Your system configuration must include either:

7970B/E (9 track) magnetic tape, or

264x terminal with Cartridge Tape Units using driver DVR05 or DVA05.

A library called \$RSLIB which contains assembler routines is included with the READR/SAVER package. READR requires a minimum of 21 pages of memory. SAVER requires a minimum of 23 pages of memory. For instructions on how to load READR and SAVER, refer to Chapter 5.

Chapter 2

Using SAVER

Introduction

The SAVER program copies disc files onto either magnetic tape or minicartridge. From the file names you supply, it builds a file-name table in memory. You have the option to sort the directory before it is copied to tape. Then each file is copied onto the tape and verified bit by bit unless you bypass the verification.

SAVER rewinds the tape at the beginning and end of the program and will overwrite any information currently on the tape. Therefore, be sure you are using a blank tape or that the contents of the tape can be overwritten. SAVER always begins writing on the beginning of the tape; it cannot skip over files to write to the middle of the tape.

SAVER Operations

When SAVER is run interactively, it displays the prompt:

Command ?

SAVER enters the command and file search phase. At this time, you can specify the files to be saved and enter the commands to set the option flags. The SAVER commands and their functions are described in the following pages. SAVER takes immediate action on some of the commands entered. For example, command "MT,lu" causes SAVER to validate the tape LU immediately and "SZ" command causes SAVER to display immediately the amount of tape needed to save the files thus far specified. You must specify all the files that are to be saved on this tape before you complete this phase. This phase is completed when you enter the /E command.

Using SAVER

SAVER enters file save phase, reads and verifies the files from the disc and places them on the tape. The first file put on the tape will be the directory. It is placed on tape in FMGR-compatible format. The directory contains the file namrs exactly as they appear on disc, with the same security code and cartridge reference.

SAVER does not have a multiple tape save capability.

If you entered the PU command either during command and file search phase, from a command file, or from a run string, SAVER now enters purge phase. You can purge the files on disc if you have the correct security code and proper access to group or system disc LUs. SAVER asks if you want to purge all of the files or if you want to select the files to be purged.

Scheduling SAVER

Run SAVER by entering:

```
:RU,SAVER[,option code[,option code...]]
```

where the option code is any number of the commands listed in below, in any order. If you are running from a runstring, SAVER does not give you the opportunity to correct errors or change options.

The following is a list of all commands:

SAVER COMMANDS:

Command	action	setting	
/A or AB	Abort SAVER immediately		
/E or EN	End search (start saving files)		
CO	Show TR files Comments	F	+-----+
EC	ECho file search CR's	F	Sort options:
ER,lu	Assign ERror LU ##	F 0	0=no sort 1=Name,SC,CRN
LI	Llst files flag	0	2=Last5,CRN 3=CRN,Name
MT,lu	Assign Mag Tape LU ##	8	4=CRN,Last5 5=Size,CRN,Name
PU	PURge files flag	F	6=CRN,size 7=SC,CRN,Name
SE,namr	SElect files via namr mask		
SO,lu	SOort the directory	F 0	(Last5 means to sort chars
SS	SuSpend SAVER		2-6 and then char 1 of each
SZ	Display tape Size		name)
T6	Save Type 6 files	F	
TR,namr	TRansfer to command file		NO or NOT in front of any
TT	Terminal type if TTY	F	command negates or resets
UN,lu	UNselect ## of files		the state of the setting.
VE	VERify	T	+-----+
??	Display SAVER commands & options		

Only the first two characters are considered in the command. Other characters may be used to increase readability. For example, enter EC or ECHO to echo file positioning.

Any command may be reset by adding NO or NOT in front of the command. For example, enter NO PURGE to turn off the purge option. The commands EC and VE are initially set to be on. To suppress the condition, enter NO EC or NO VE.

You can create a command file and use the TR,namr to run READR from this file. For more information, refer to the explanation of the TR command found later in this chapter. A sample command file is shown below:

```
* sample SAVER command file
MT,4
T6
SE,::Pl
/E
```

You may also run SAVER interactively by not specifying any commands in the runstring.

If SAVER is to be terminated prematurely, it must be done properly so that it can do the appropriate clean up work. Enter the "/A" command or "BR,SAVER" at the system breakmode to produce clear aborts. If SAVER is not aborted in either of these ways, it may have left files with open status. You should not abort SAVER with "OF,SAVER".

Step-by-Step Instructions

To use SAVER, follow the step-by-step instructions given below. All user inputs are underlined. Note steps 2 through 6 may be in any order.

1. Run SAVER by entering

:RU,SAVER

SAVER displays:

SAVxx, REV. rrrr on @ tttt ddmmmyy with room for ffff files

where:

xx	LU of the session terminal.
rrrr	Revision code.
tttt ddmmmyy	Time, day, month, and year the program is started.
ffff	The largest number of file names allowed in the file-name table.

2. SAVER then prompts:

Command ?

Enter

??

to see a list of all commands and options.

3. Specify the tape LU by entering:

MT,lu

LU 8 is the default, LU 4 and LU 5 are usually Cartridge Tape Units. Only devices using drivers DVR23 and DVR05 are acceptable.

4. Specify file selection echo by entering:

EC

Now, when SAVER searches disc cartridge, it will display a disc cartridge header and the namrs of the files it found and

are to be saved.

5. Select the files to be saved by entering:

SE,namr

The namr may contain masking characters. For example, enter SE,&-----:SH to save all files beginning with an & on cartridge SH. Specify all files you want to be saved onto this tape. You cannot re-enter the search phase after the files are stored on tape. No more files may be saved on this tape.

6. Purge disc files after saving them by entering:

PU

7. Enter

/E

and SAVER displays approximately how much tape will be needed to do the save and asks for permission to continue. When you are certain you have enough tape, enter YES and SAVER will save the files.

When SAVER completes the saving, it terminates.

Using SAVER

Command and File Search Phase

During this phase, you enter commands to define how SAVER is to place the files from the disc onto the tape. These commands are explained below.

CO Comment Echo

Display the comments in a command file. Comments are ignored by SAVER, but by specifying CO, they are displayed with the commands.

EC Echo

Enable echoing of the file position. This option is useful if you want to know where on the disc SAVER is finding files. For instance, if you specify a file namr with no cartridge reference number, SAVER searches all discs for that file name. With echo enabled, SAVER will display each file namr found and the disc LUs it searched.

ER,lu Error log LU

Assign another LU as an error log. This is typically a printer or other hardcopy device to show errors detected by SAVER in any step.

LI List selected files

This command provides a compact list of file names. It may be used to view the results of the sort command.

MT,lu Tape LU

Set the LU number for the tape unit. Initial condition is LU 8. The value may be the LU of either a 7970B/E magnetic tape drive or the LU number of the Cartridge Tape Unit on a 264x terminal. SAVER will immediately verify the LU number. If an invalid LU number is given, SAVER displays:

ERROR...SAVER will not work with LU xx

and allows you to correct the error. If the LU is cartridge tape, SAVER resets the hardware straps of the terminal.

NOTE

SAVER does not support the use of the Cartridge Tape Units on a multi-point terminal because they do not have independent RTE logical units. Also, SAVER does not support Cartridge Tape Units (CTUs) on the 16 channel (12920) multiplexer because of a conflict in driver control codes.

PU Purge option

Enter purge file phase after SAVER completes saving and verifying. No immediate action occurs as specifying this option simply sets the purge option flag. Disc files may be purged only if they are on your private cartridge, on a group cartridge if you are group manager, or on a system cartridge if you are the System Manager. You can choose to purge on a per-file basis. Refer to the Purge File Phase section for details. This option can be cancelled by entering NO PU.

The PU command is only needed if the files to be saved are to be removed from disc after the save process is complete. PU automatically verifies the files, therefore, the NO VE option cannot be used.

SE,namr Search for namr

Save all files on the disc whose namrs fit the search namr given. The format of the search namr is:

name :security code :cartridge reference number :type

A character in the file name may be replaced with a "-" (minus sign) to create a mask for that character.

If no name is given (i.e., just the security code or cartridge reference are given) the name "-----" is implied. In other words, any name is valid. If the first character is to be masked and trailing characters are numbers, an additional "-" has to be appended at the end of the file name to distinguish the name from an integer value (refer to the examples below).

Using SAVER

If a security code is specified, then the security code of each file fitting the search name is checked to determine if it is to be saved. If no security code is specified, then for private cartridges, all files fitting the search name will be saved, and for system and group cartridges, all files fitting the search name with positive security codes will be saved. You must have group or System Manager status to save a read-protected file (i.e., files on a group or system cartridge with a negative security code). For any file saved from a group or System Manager cartridge, the security code will be saved as zeros if the user is not group or System Manager, respectively.

If a cartridge reference is specified, all files on that cartridge matching the search name will be saved. If no cartridge reference is specified, then all cartridges will be searched.

Some examples:

SE,&-----:SH Search for all files beginning with "&" on cartridge SH.

SE,FILE--:JA Search for all file names whose first four characters are "FILE" and whose security code is JA.

SE,:SH Search for all files on cartridge SH the name is implied as any file.

SE,-123- Search for all files whose second through fourth characters are "123".

Example: X123, \$123A.

SE,:5 Search for all relocatable files (type 5).

Be sure to specify all files you want placed on tape at this time. Once the File Save Phase is entered, you may not specify any more files to be placed on that tape.

SAVER ignores overlapping search file masks (i.e., duplicates). However, it will print out a warning message and ask permission to continue. If running from a runstring, SAVER displays a warning and saves the file specified.

After each "SE,namr", SAVER enters the namr (or namrs if masks are used) into the file-name table in memory. It then reports how many new files were placed in the table with that SE command and how many file names total is in the table. You may use the LI command to see the currently selected file names.

SO,n Sort directory

Sort the directory in a manner specified by n. Parameter n ranges from 0 to 7. These are explained below.

n sort by

- 0 do not sort (the default).
- 1 file name, security code, and then cartridge reference.
- 2 last 5 characters in file name, then first character.
- 3 cartridge reference, then file name.
- 4 cartridge reference, last 5 characters in file name, then first character.
- 5 file size, cartridge reference, then file name.
- 6 cartridge reference, then file size.
- 7 security code, cartridge reference, then name.

The following command list selects a variety of file names. These files will be sorted with a few of the sort options listed above.

Command ? SE,XYZ:SU:P1

Command ? SE,XXYZ:HY:P2

Command ? SE,ABC:41:BT

Command ? SE,BTTY:HS:P1

Command ? SE,ABC:34:CT

Command ? SE,&XYZ:HY:P2

Command ? SE,'XYZ:HY:P2

Command ? SO,n

<u>Sort option selected</u>	<u>File directory format af</u>
Option 1 file name, security code, then cartridge reference.	&XYZ :HY:P2 'XYZ :HY:P2 ABC :34:CT ABC :41:BT BTTY :HS:P1 XXXYZ :SU:P1 XYZ :SU:P1
Option 2 last five characters in file name, then first character	ABC :34:CT ABC :41:BT BTTY :HS:P1 &XYZ :HY:P2 'XYZ :HY:P2 XXXYZ :SU:P1 XYZ :SU:P1

Using SAVER

Option 3 cartridge reference,	ABC	:41:BT
then name.	ABC	:34:CT
	BTTY	:HS:P1
	XXYZ	:SU:P1
	XYZ	:SU:P1
	&XYZ	:HY:P2
	'XYZ	:HY:P2

Option 7 security code,	ABC	:34:CT
cartridge reference,	ABC	:41:BT
then name.	BTTY	:HS:P1
	&XYZ	:HY:P2
	'XYZ	:HY:P2
	XXYZ	:SU:P1
	XYZ	:SU:P1

Sorting (Rev 2226 or later) takes place immediately on the currently selected files and also once again just before writing the directory to tape. The LI command can be used to see the file order.

SS Suspend SAVER

SS command causes SAVER to pause to allow user to OFF programs, mount/dismount cartridges, run WHZAT, etc. The system breakmode command 'GO' will resume SAVER.

SZ Display tape size

Display an estimate of the tape length required to save the files selected to this point. The information is displayed immediately upon entering the command and also repeated before SAVER enters the file save phase. The size is an estimate only due to tape retries and small timing differences in tape units. If too many files are selected, use the UN command to reduce the file count.

TR,NAMR Transfer to command file

Transfer to a disc file containing SAVER commands. Namr may not be an LU number but may be a type 0 file with read capability. SAVER will read commands from that file. The format of the commands is the same as those being entered interactively. Lines beginning with "*" are ignored to allow for documentation. A TR with no namr is an implied TR,1.

When running from a command file, SAVER will still allow you to take corrective actions if necessary. If the command file ends with the /E command, SAVER will terminate following executing the commands in the file. If not, SAVER will prompt "Command ?" after executing the commands in the file. If the TR file has no /E, the end of the file is taken as an implied /E.

TT Hardcopy Mode

Select hardcopy mode for dialogue on a hardcopy terminal. SAVER inserts a line feed at the end of each line. Initial condition is the CRT mode with no line feed. This is done to minimize scrolling data off the CRT. This option can be cancelled by entering NO TT.

T6 Type 6 file save

Save type 6 files. You may cancel this option by entering NO T6. Type 6 files can only run on the exact operating system on which they were loaded.

UN,n Unselect Files

The UN command removes previously selected files starting with the last file shown by the List command. The mandatory parameter n represents the number of files to be removed. This allows dropping one or more files when the maximum tape size is exceeded. By using the LI,SZ and UN command, the final selection can be tailored to the tape being used.

VE Verify

Enable verification. Normally after SAVER copies a file onto disc, it backspaces the tape and compares the tape file word for word with the disc file. This option may be cancelled by entering NO VE at the "Command ?" prompt.

/A or AB Abort SAVER

Abort SAVER. The other way to abort SAVER properly is to enter BR,SAVER at the system breakmode request. One of these two methods must be used to allow SAVER to do the appropriate clean up activities.

Using SAVER

/E or EN End of search

Leave the search phase and enter the file save phase. /E is implied at the end of a command file and at the end of a runstring.

?? or ? List all flags and commands

Display the current status of the option flags and all of the commands.

File Save Phase

By specifying at least one file name and entering a /E, SAVER completes the search phase. It calculates and displays an estimate of the length of the tape needed to save the files and asks whether to continue with the prompt "OK to proceed? (Y/N)". If writing more than one file to magnetic tape, make sure you have enough tape on that one reel. If writing to mini-cartridge, you must have enough tape on one cartridge tape to do the save. SAVER may be terminated at this point by entering "N". If running from control of a runstring or command file, SAVER skips this question and starts saving immediately or aborts if multiple files on multiple reels are required.

SAVER writes the file-name table onto the tape as the directory. It then opens each file in turn and writes it to the tape in a packed format (refer to Appendix B for a description of the tape format).

SAVER is not interactive during this phase. However, you may terminate it by entering "BR,SAVER" in the system breakmode. Note that the tape is not complete and should not be used to restore files.

After each file is saved, SAVER backspaces the tape and compares the tape file to the disc file bit by bit. Verification can be disabled with NO VE.

If PU was not specified, SAVER terminates at the end of the file save phase.

File Purge Phase (optional)

After SAVER completes the file save phase, if you have specified PU, it will prompt: "Purge files (NO,SOME, or ALL)?"

NO SAVER terminates.

ALL SAVER asks "Are you sure (Y/N)" Any other answer besides "Y" will be taken as "N" and the Purge files prompt returns. A "Y" answer will cause the disc files that were saved on tape to be purged.

SOME SAVER displays: "SAVER will ask permission for each file...answer Yes,No or Quit". Then for each file, SAVER prompts: "Purge name:sc:crn (Yes/No/Quit)?". YES will purge the file, NO will skip over this file and cause the next file prompt to be given, QUIT will terminate SAVER.

In the session environment, there are restrictions on the purge operation for group and session cartridges. Files on a group cartridge may only be purged by the group or System Manager. Files on a system cartridge may only be purged by the System Manager. Files on a non-session cartridge can only be purged by a non-session user or System Manager.

When SAVER completes this phase, it terminates.

Using SAVER

Examples

1. In this example, the user is simply saving a group of files onto minicartridge. The user sets hardcopy mode (TT) and the LU is specified (MT,4) followed by the search file namr. The SZ command tells him how much tape SAVER will use. He is satisfied with that number so he enters /E to start. SAVER asks if the tape size is correct, the user enters Y and SAVER creates and verifies the directory. Then SAVER saves and verifies each file and displays out the full namr and tape file number for each file.

:RU,SAVER

SAVER, REV.2226 on @ 1217 18MAY82 with room for 779 files.

Command? ??

S A V E R C O M M A N D S:

Command	action	setting	+	-----+
VE	VErify	T		Sort options:
T6	Save Type 6 files	F		0=no sort 1=Name,SC,CRN
EC	ECHO file search CR's	F		2=Last5,CRN 3=CRN,Name
TT	Terminal type is TTY	F		4=CRN,Last5 5=Size,CRN,Name
PU	PURge files flag	F		6=CRN,size 7=SC,CRN,Name
CO	Show TR files COmments	F		
LI	LIst files flag	0		(Last5 means to sort chars
MT,##	Assign Mag Tape LU ##	8		2-6 and then char 1 of each
SO,##	SOrt the directory	F 0		name)
ER,##	Assign ERror LU ##	F 0		
UN,##	UNselect ## of files			NO or NOT in front of any
SZ	Display tape SiZe			command negates or resets
SS	SuSpend SAVER			the state of the setting.
TR,namr	TRansfer to command file		+	-----+
SE,namr	SElect files via namr mask			
/E or EN	End search (start saving files)			
/A or AB	Abort SAVER immediately			

To reset any option, type NO or NOT in front of the command, for example: NO EC turns off the file search echo.

Command? TT

Command? MT,4

Command? SE,&S----::SU

3 New files, 3 total.

```

Command? SZ
Apx.    2.9 ft @ 800 BPI,      2.1 ft @ 1600 BPI magtape
or      56.8 inches on CTU's.
Command? /E
Apx.    2.9 ft @ 800 BPI,      2.1 ft @ 1600 BPI magtape
or      56.8 inches on CTU's.
OK to proceed? (Y/N) Y
<<RTE FILE SAVE 1217 18MAY82. 3 FILES. 7.BLOCKS R= 128. REEL= 1>>

```

```

Create directory
Verify directory
  Saving &SUJO :      0:      SU:      4:      2:      0      1
  Verify
  Saving &STBIT:      0:      SU:      4:      3:      0      2
  Verify
  Saving &SUE  :      0:      SU:      4:      2:      0      3
  Verify

```

```

SAVER off @ 1219 18FEB81
:

```

2. In this example, the user is again saving a few files but this time requests to purge the disc files after they are saved and verified. The minicartridge LU (MT,4) is given and the search file namr is &-OMEY::SU. SAVER found 3 files fitting that namr mask. The purge option (PU) is specified and then /E to execute. After saving and verifying all files, SAVER enters the purge phase by prompting "Purge files (NO, SOME or ALL)?". The user answers SOME. He specifically wants to purge the file &COMEY so he answers YES to the request. He answers NO to the others. An alternative is to answer QUIT after purging the first file.

```

:RU,SAVER

```

```

SAVER, REV.2226 on @ 1224 18MAY82 with room for 779 files.

```

```

Command? MT,4

```

```

Command? TT

```

```

Command? SE,&-OMEY::SU

```

```

      3 New files,      3 total.

```

```

Command? PU

```

```

Command? /E

```

```

Apx.    2.9 ft @ 800 BPI,      2.1 ft @ 1600 BPI magtape

```

```

or      53.2 inches on CTU's.

```

```

OK to proceed? (Y/N) Y

```

```

<<RTE FILE SAVE 1224 18MAY82. 3 FILES. 6.BLOCKS R= 128. REEL= 1>>

```

Using SAVER

```
Create directory
Verify directory
  Saving &COMEY:      0:    SU:    4:    2:    0          1
  Verify
  Saving &DOMEY:      0:    SU:    4:    2:    0          2
  Verify
  Saving &HOMEY:      0:    SU:    4:    2:    0          3
  Verify
```

Purge files (NO, SOME or ALL)? SOME

SAVER will ask permission for each file...answer YES, NO or QUIT

Purge &COMEY : 0: SU: 4: 2: 0 (Yes/No/Quit)? YES

1 &COMEY: 0: SU: 4: 2: 0 purged.

Purge &DOMEY : 0: SU: 4: 2: 0 (Yes/No/Quit)? NO

Purge &HOMEY : 0: SU: 4: 2: 0 (Yes/No/Quit)? NO

SAVER off @ 1226 18MAY82

:

3. In this example, SAVER is run using a runstring. The user specifies the magnetic tape LU (MT,8), the search file namr SSS::SU, and the purge option (PU). The /E ends the string. For the purge option, SAVER always goes interactive. In this case, the user failed to enter anything and when the terminal timed out, SAVER interpreted this as a 'NO' command.

:RU,SAVER,TT,MT,8,SE,SSS::SU,PU,/E

SAVER, REV.2226 on @ 1246 18MAY82 with room for 779 files.

1 New files, 1 total.

Apx. 1.0 ft @ 800 BPI, .7 ft @ 1600 BPI magtape
or 25.1 inches on CTU's.

<<RTE FILE SAVE 1246 18MAY82. 1 FILES. 2.BLOCKS R= 128. REEL= 1>>

```
Create directory
Verify directory
  Saving SSS :      0:    SU:    4:    2:    0          1
  Verify
  Purge files (NO, SOME or ALL)?
```

SAVER off @ 1246 18MAY82

:

Chapter 3

Using READR

Introduction

The READR program reads files from either magnetic tape or minicartridges and restores them to a disc cartridge. You decide which files are to be read and on what disc cartridge they are to be placed. The files can be verified as they are read. You may want to replace the same files on the disc if, for instance, the files on tape are more recent (i.e., they contain software updates).

When the files on tape were saved, the entire file name was placed in the directory. Unless you specify otherwise, the files will be restored by READR onto the same disc cartridge and with the same security code from which they were saved. READR provides an option to display the directory.

READR Operations

When READR is run interactively, it displays the prompt:

Command ?

READR enters the command and file selection phase. At this time, you may optionally specify the destination, security code, update function, and verification state among others. READR takes immediate action on some of the commands entered. For example, the LI command will immediately print the tape directory and MT,lu will immediately validate the tape LU. Now you can declare the files to be restored. This phase is completed when you enter the /E command.

READR enters the file restoration phase and restores the tape files to disc in the manner you requested. If READR has problems restoring a file, it displays an error message and, if possible, prompts you for corrective action. When it has completed restoring the specified files, it reprompts "Command ?". You may now change any of the options and specify another group of files.

Using READR

The commands and option flags are explained later in this chapter. If no more files are to be restored, READR is terminated with a /E command.

In restoring a large file saved on more than one magnetic tape, READR will prompt you to mount the next tape. Multiple files on multiple tapes are not available.

Scheduling READR

Run READR by entering:

```
RU,READR[,option code[,option code...]]
```

where the option code is any number of the commands listed below in any order. If you are running from a runstring, READR does not give you the opportunity to correct errors or change options.

Command	Explanation	Default Values
AL:##	Restore all files	(NO)
CO	Comment Echo	Echo off.
EC	Echo file positioning	Echo on.
LI:lu	List directory, lu is output device	Log LU.
MT,n	magtape or minicartridge LU	LU 8.
OC,n	cartridge reference number override	File's original CRN as saved.
OS,n	security code override	File's original SC.
SE,namr	Masked file name restore	Restore selected files.
TR,namr	Transfer to command file	N/A
TT	Select hardcopy mode	CRT mode.
UP	Update files mode	Update off.
VE	Verify	Verify on.
/A	Abort READR	
/E	Exit option setting mode	
??	List all flags and commands	

Only the first two characters are considered in the command. Other characters may be used to increase readability. For example, enter EC or ECHO to echo file positioning.

The commands OC, OS, TT, and UP, may be reset by adding NO or NOT in front of the command. For example, enter NO UPDATE to turn off the update function. AL, EC and VE are initially set on. To suppress the condition, enter NO AL, NO EC, or NO VE.

You can create a command file and use the TR,namr command to run READR from this file. For more information, refer to the explanation of the TR command found later in the chapter. A sample command file is shown below:

```
*READR Command File
MT,4
SE,&-----
OC,SU
/E
```

You can also run READR interactively by not specifying any commands in the runstring.

If READR is to be terminated prematurely, it must be done properly so that it can do the appropriate clean up work. Enter the "/A" command or "BR,READR" at the system breakmode to produce clean aborts. If READR is not aborted in either of these ways, it may leave files in open status or it may not be able to purge scratch disc files.

Step-by-Step Instructions

To use READR, follow the step-by-step instructions given below. All user inputs are underlined. Note that steps 3-7 may be in any order.

1. Run READR by entering:

```
:RU,READR
```

READR displays:

```
REAxX REV. nnnn on @ tttt ddmmmyy with room for ffff files
```

where:

xx	LU of the session terminal.
nnnn	Revision code of the program.
tttt ddmmmyy	Time, day, month and year the program is started.
ffff	Maximum number of files that can be read from the tape directory.

Using READR

2. READR then prompts:

Command ?

Enter

??

to see a list of all commands and options.

3. Specify the tape LU by entering:

MT,n

LU 8 is the initial condition, LU 4 and LU 5 are usually Cartridge Tape Units. Once the directory is read, MT is no longer changeable.

4. (optional) List the tape directory by entering:

LI

or to print the directory on LU 6:

LI:6

5. Select the files to be restored. This is done one of three ways:

- Select all the files on the tape by entering:

AL

- Select a group of files by using a masking character. For example, enter:

SE,&-----

to restore all files beginning with an &.

- Restore a single file by entering:

SE,namr

Do not forget to specify the security code and cartridge reference number to distinguish one file name from another identical name in the tape directory.

6. Check the cartridge and security code of the tape file. READR will restore a file to the same cartridge as given in the tape file namr. If you want the file restored to a disc cartridge other than that of the tape file namr, enter:

OC,n

where n is the new disc cartridge reference number where the tape file is to be restored.

The same situation exists for the security code. If you want the file restored with a security code other than that of the tape file namr, enter:

OS,n

where n is the new security code of the restored file.

7. READR will update your disc files with the files on tape if you enter:

UP

If UP was previously set, you may turn the option off with NO UP.

8. Enter:

/E

and READR will go into file restoration phase during which it will restore the file(s). When it completes that phase, READR prompts:

Command ?

9. At this point, either enter /E to terminate READR or repeat the preceding steps 4-8.

Using READR

Command and File Selection Phase

During this phase, you enter commands to define the manner in which READR is to retrieve the files from the tape. The following paragraphs give detailed explanations about each command.

AL:## Restore all files

Restore files on the tape to disc. If SE,namr is entered after AL during the same phase, it will override the AL command. The # signs represent starting file number and ending file number parameters. They are optional. If no options are entered following AL, the default is to restore all files. Thus, AL:3:17 will restore files 3 through 17 and AL will restore all files.

CO Comment Echo

Display comments in a command file. Normally, READR ignores comments in command files. Enter CO and READR will list the comments along with the commands in the file.

EC Echo

Enable echoing of the tape position. This option is useful if you are seeking a single file at the middle of the tape. By echoing the tape position, you will know the current tape position and the position of the desired file. Initial condition is echo on. The option may be cancelled by entering NO EC at the "Command ?" prompt.

LI:lu List tape file directory

List the tape directory to the user's terminal if :lu is not specified. The list may optionally be sent to a printer by appending the printer LU with a colon. For example, LI:6 will print the directory on LU 6.

The directory can also be accessed with the FMGR DU or ST command. For example, to print the directory on the tape at LU 4 to the line printer at LU 6, enter :DU,4,6 or :ST,4,6.

Immediately upon entering LI for the first time, READR outputs the tape header:

```
<<RTE FILE SAVE tttt ddmmyy. f FILES, bb BLOCKS, R=rrr. REEL=1 >>
```

where:

```
tttt    Time when the save was done.
ddmmyy  Day, month and year of the save.
f        Number of files on the tape.
bb       Total number of blocks in all of the files.
rrr      Record size in words.
l        Tape reel number.
```

The tape directory is then read and displayed (or sent to the specified LU) in the following format:

```
      n   name:      sc:      cr:      ty:      sz:      r
```

where:

```
n       Tape file number.
name    File name.
sc      File security code.
cr      File cartridge.
ty      file type.
sz      File size.
r       Record size (type 2 only).
```

For each subsequent entry of the LI command, READR immediately displays the directory as shown above without rereading the tape.

MT,n Tape LU

Set the LU number n, for the tape unit. If n is not entered, the default is LU 8. The value n may be the LU of either the 7970 magnetic tape drive or one of the LU numbers of the Cartridge Tape Units (CTUs) on a 264x terminal using driver DVR05 or DVA05. READR will immediately verify the LU number. If an invalid LU number is given, READR displays:

Magtape specified is not defined or invalid.

and if run interactively, allows you to correct the error. If LU is LU 4 or LU 5 (cartridge tape units), READR resets the hardware straps of the terminal.

Using READR

NOTE

READR does not support the use of the CTUs on a multi-point terminal because they do not have independent RTE logical units. Also, READR does not support CTUs on the 12920 16-channel multiplexer because there is a conflict in driver control codes.

OC,n Override Disc Cartridge

Restore the files on tape to n, the disc cartridge specified. Normally, READR restores the files to the cartridge reference number (CRN) of the tape file namr. This command allows you to replace that CRN with another n. Parameter n is either a positive CRN, negative LU number, or zero to use any cartridge with enough room for the file. The cartridge override is cancelled by entering NO OC or entering OC with no parameter in interactive mode or from a transfer file.

OS,n Override Security Code

Restore the files on tape to disc with the specified security code. Normally, READR uses the security code the files had when they were saved. The parameter can be positive, negative or zero. The security code override is cancelled by entering NO OS or entering OS with no parameter in interactive mode or from a transfer file. OS can be used to update files on disc by supplying the security code of the file on disc. Two attempts are made to match security codes when updating files. Once the files original SC when saved, and second with the OS,sc parameter (if supplied).

SE,namr	Select all files matching namr to restore
SE:#:#,namr	Select file # through file # to restore
SE,n	Select file number n to restore

To select all the files for a particular namr from a tape to restore to disc, the command SE,namr is used. The format of the search namr is:

file name :security code :cartridge reference number

This can be used to select files containing specific characters, security codes, and CRNs.

Examples:

```

SE,$----- Select all files beginning with "&".
SE,FILE--   Select all file names whose first four characters
            are "FILE".
SE,::P1     Select all files that were stored on cartridge P1.
SE,--LIB-:SH Select all files whose third through fifth
            characters are "LIB" and whose security code
            is "SH".
SE,-123-    Select all files whose second through fourth
            characters are "123" such as A123 or $123X.
SE,:::5     Select all type 5 files.

```

The user can specify the beginning file number and ending file number by using the optional :#:#,namr parameters. For example, to select files four through 15:

```
SE:4:15,-----
```

READR requires input in the namr parameter. If there is no specific file namr, use dashes. If a namr is given, the select command looks like this.

```
SE:4:15,FILE--
```

This command tells READR to select all the files between file number 4 and file number 15 that begin with "FILE". A character in the file name may be replaced with a "-" (minus sign) to create a mask for that character.

Another way to select a file is to use the SE,n command. This allows the user to select according to the sequence number of the file on the tape. The n represents the sequence number.

Example:

```
SE,125
```

This would select the 125th file on tape.

Only one SE,namr can be effective during a particular file selection phase. Entering a second SE,namr during a selection phase will override the first. An AL command entered after an SE,namr will likewise override a previous SE,namr. Once the selected file(s) are restored, a new SE,namr may be entered.

The SE,n where n is a file number, is useful when partial restores are needed and the tape needs to continue in a later session at a specific file number.

Using READR

TR,namr Transfer to command disc file

Transfer to a disc file containing READR commands. Namr may not be an LU number but may be a type 0 file with read capability. READR will read commands from that file. The format of the commands is the same as those being entered interactively. Lines beginning with "*" are ignored to allow for documentation. A TR with no namr is an implied TR,1.

When running from a command file, READR will still allow you to take corrective actions if necessary. If the command file ends with the /E command, READR will terminate after executing the commands in the file. If not, READR will prompt "Command ?" after executing the commands in the file.

TT Terminal Type

Select hardcopy mode for dialogue on a hardcopy terminal. READR inserts a line feed at the end of each line. Initial condition is the CRT mode with no line feed. This option can be cancelled by entering NO TT.

UP Update

Replace each disc file with a tape file of the same name. READR does this by creating a scratch file, restoring and verifying the tape file to the scratch file, purging the old disc file, and renaming the scratch file. It will not perform the update if errors occurred on the verification or if the disc file cannot be purged (i.e., its security code does not match the security code of the tape file name or "OS,n" command). Update mode automatically invokes the verify option and as long as UP is set, verify may not be reset. The option may be cancelled by entering NO UP.

If a tape error occurs, READR does not overwrite the existing disc file in update mode. Instead, READR creates a scratch file on the same disc cartridge of the disc file. Therefore, you must have enough room on the cartridge to hold the scratch file. You may have to pack the disc cartridge periodically in order to update many files. In this case, the optional start and finish file numbers (AL and SE commands) will be useful.

VE Verify

Enable verification of the files on tape. Normally, READR reads a file from the tape and copies it to disc; it will compare the tape file to the disc file bit by bit. This process may be cancelled by entering NO VE at the "Command ?" prompt.

Verifying does take extra time, but the accuracy of the restored files cannot be known without a verify pass. Verify is set automatically with the UPdate command and may not be turned off until UPdate is cancelled.

/A Abort READR

Abort READR. The other way to abort READR properly is to enter BR,READR from system breakmode. One of these two methods must be used to allow READR to do the appropriate clean up activities. OF,READR is not recommended under any circumstances.

/E End of Command and File Selection Phase

Leave the command and file selection phase and begin the restoration phase. READR will restore files as you have commanded it to do. To terminate READR, enter /E without defining any search namr with SE,namr or AL. /E is implied by reaching the end of file in a command file, or by reaching end of the runstring.

?? or ? List all flags and commands

Display the current status of the option flags and all of the commands.

Using READR

File Restoration Phase

By specifying a search file namr and entering /E, READR begins the file restoration phase. It displays the header record from the directory on the tape:

```
<<RTE FILE SAVE tttt ddmmmyy. f FILES, bb BLOCKS, R=rrr. REEL=1 >>
```

where:

tttt	Time when the files were saved.
ddmmmyy	Day, month and year.
f	Number of files on the tape.
bb	Total number of blocks in all of the files.
rrr	Record size in words.
l	Tape reel number.

READR uses the file name, security code and cartridge fields given in the SE,namr command or AL command to search the file tape directory. READR then positions the tape, reads and restores the file(s) on disc. It performs the verify operation unless verify was cancelled.

If you specified the update option, READR creates a scratch disc file, reads the tape file onto disc, and verifies it, attempts to purge the old disc file and renames the scratch file. The security code of the disc file must match the security code of the tape file or the security code specified in the OS,n command; otherwise, the update is not done.

If no file is found on tape with the specified search namr, READR displays:

```
No file fitting search namr found on this tape
```

and returns to command and file selection phase.

If the file extends beyond one tape reel, READR will prompt you to mount the next tape and use the header and directory to determine that the correct reel was given.

If READR encounters a problem in trying to create the new file name (UP has not been selected), it will print:

```
CREAT error nnn. /A, HElp, PURge, ALter, OC,n, OS,n, or SKip  
this file?
```

Error nnn is the FMP error code returned by the CREAT call. READR will wait for instructions to correct the error.

Enter:

```

/A      To terminate READR.
HE      For more information about the error.
PU      To purge a duplicate disc file, if one exists and restore
        the file.
AL      To alter the file namr that READR is trying to create.
        READR displays the namr and prompts you to enter a new
        namr. This is a temporary change for the current file
        only. For this response, enter only the parameters that
        are to be changed. For example, if you want to alter
        the cartridge reference on the namr to su, enter ::SU.
        READR will change the cartridge reference without
        affecting the name or security code parameters. The
        name may also be changed at this point.
OS,n    To permanently alter the security code for all remaining
        files.
OC,n    To permanently alter the disc cartridge reference for all
        remaining files.
SK      Skip to next file or, if all files have been restored,
        return to command and file selection phase.

```

A carriage return or any other response returns to the Command ? prompt.

Examples

1. The first example is a simple restoration of all files on a minicartridge. The user ran READR interactively and begin by requesting to see all commands and flags (??). Then, he selected hardcopy mode (TT) and a tape unit (MT,4). He asked for a directory of the tape (LI) and READR immediately listed it. He asked to have all the files restored (AL), then entered /E to enter the file restoration phase. READR displayed the tape header showing when the save was done and the number of files on the tape. READR then restored and verified each file. When it completed, it prompted Command ? and waited for more instructions. The user entered /E and since no more search namrs were specified, READR terminated.

:RU,READR

REA86 REV.2226 on @ 1401 18MAY82 with room for 1238 files
Command? ??

Using READR

Command	---- Action ----	Setting
/E or EN	END option setting mode	
/A or AB	ABort READR	
SS	SuSpend READER	
UP	Update files mode	F +-----+-----+
VE	VERify	T To reset any option,
TT	Terminal type is TTY	F type NO or NOT in
TR,namr	Transfer to command file	front of the command.
LI:<lu>	LIst file directory, <lu>	+-----+-----+
	may be a printer	
MT,n	Select MagTape LU	8
AL:##	Restore all files	F
	## = start:finish file #.	
SE:##,namr	Select filemask to restore	
	## = start:finish tape file #/	
EC	ECho tape positioning	T
CO	Echo TR file COmments	F
OC,n	Override CRN	F
OS,n	Override S.C.	F
Command?	<u>TT</u>	
Command?	<u>MT,4</u>	
Command?	<u>LI</u>	

<<RTE FILE SAVE 1635 18MAY82 6 FILES 18.BLOCKS R=128 REEL= 1>>1>

TAPE DIRECTORY

1 TSTRS1:	0:	P1:	4:	3:	0
2 TSTRS3:	0:	P1:	4:	3:	0
3 TSTRS4:	0:	P1:	4:	3:	0
4 TSTRS5:	0:	P1:	4:	3:	0
5 TSTRS :	0:	P1:	4:	3:	0
6 TSTRS2:	0:	P1:	4:	3:	0

END OF DIRECTORY

Command? AL

Command? /E

Restore	1 TSTRS1:	0:	P1
Verify			
Restore	2 TSTRS3:	0:	P1
Verify			
Restore	3 TSTRS4:	0:	P1
Verify			
Restore	4 TSTRS5:	0:	P1
Verify			
Restore	5 TSTRS :	0:	P1
Verify			
Restore	6 TSTRS2:	0:	P1
Verify			
Command?	<u>/E</u>		

READR off @ 1403 18MAY82

:

2. This example shows the user again restoring from minicartridge (MT,4) and asking for a file directory. This time, however, the user asked for only some of the files. When READR tried to restore the first file, it found a duplicate file. The user entered AL to the question and renamed the file. The user entered /E after the next Command ? prompt to terminate.

```
:RU,READR
REA86 REV.2226 on @ 1414 18MAY82 with room for 1238 files
Command? TT
Command? MT,4
Command? LI
```

```
<<RTE FILE SAVE 1409 18MAY82 14 FILES 74.BLOCKS R=128 REEL= 1>>
```

TAPE DIRECTORY

1	&LWOFF:	0:	P1:	4:	12:	0
2	&LWFTN:	0:	P1:	4:	2:	0
3	&LWFN4:	0:	P1:	4:	2:	0
4	&LWFFN:	0:	P1:	4:	2:	0
5	&LWA01:	0:	P1:	4:	4:	0
6	&LWA02:	0:	P1:	4:	4:	0
7	&LB1.3:	0:	P1:	4:	5:	0
8	&LB4.1:	0:	P1:	4:	5:	0
9	&LB4.2:	0:	P1:	4:	6:	0
10	&LB4.4:	0:	P1:	4:	7:	0
11	&LB3.1:	0:	P1:	4:	1:	0
12	&LB1.1:	0:	P1:	4:	10:	0
13	&LB1.2:	0:	P1:	4:	8:	0
14	&LB3.2:	0:	P1:	4:	6:	0

END OF DIRECTORY

Command? SE,&LW---

Command? /E

CREAT error -2 on &LWOFF: 0: P1

/A,HElp, PURge, ALter, OC,n, OS,n, or SKip this file? HE

Using READR

Duplicate file name.

/A,HElp, PURge, ALter, OC,n, OS,n, or SKip this file? AL

Current NAMR is &LWOFF: 0: P1, you may change name, SC,
and/or CRN.

Input new namr: &SHOFF:

Restore 1 &SHOFF: 0: P1

Verify

Restore 2 &LWFTN: 0: P1

Verify

Restore 3 &LWFN4: 0: P1

Verify

Restore 4 &LWFFN: 0: P1

Verify

Restore 5 &LWA01: 0: P1

Verify

Restore 6 &LWA02: 0: P1

Verify

Command? /E

READR off @ 1418 18MAY82

:

3. In this example, READR is run using a command string. The user has selected the magnetic tape drive and will restore the file "SJH::SU". Since the TT option was not set, the restore process will appear on one line.

:RU,READR,MT,8,SE,SJH::SU

REA86 REV.2226 on @ 1251 18MAY82 with room for 1238 files

Command? MT,8

Command? SE,SJH::SU

Command? /E

Reading directory

<<RTE FILE SAVE 1247 18MAY82 1 FILES 2.BLOCKS R=128. REEL= 1>>

End of directory

Verify 1 SJH : 0: SU

Command? <implied /E>

READR off @ 1251 18MAY82

:

Chapter 4

Updating the System Disc

Program READR will replace files on disc with the files on a minicartridge saved using the SAVER program. Be sure that READR is properly loaded on your system (refer to Chapter 5) before beginning.

Required System Setup

The disc cartridge to be updated must be a system or peripheral file manager cartridge, mounted and properly initialized.

You should pack the disc cartridge before starting. The UP function creates a scratch disc file, purges the old disc file and D.RTR does not reclaim that old space unless the new file exactly fits in the empty space. After many updates, the new files will be at the end of the cartridge and there will be blank areas in the middle of the cartridge. The disc cartridge should be packed to give READR more room at the end of the cartridge to build its scratch files. If this happens in the middle of a large restore, use the optional start/finish file numbers for AL and SE command to complete the restore operation after a file manager PK command.

Operations

1. To begin, enter

:RU,READR

READR prompts:

Command ?

2. Specify the minicartridge LU:

MT,n

For instance enter MT,4 to specify the left CTU of the terminal.

Updating The System Disc

3. It is recommended to update the disc with all the files on the tape, so to restore all file, enter:

AL

4. Enter

UP

to replace the files on disc with the files on tape.

5. Override the disc cartridge reference number (CRN):

OC,cr

where cr is your disc CRN. Override the security of the disc files:

OS,sc

where sc is the security code of the disc files to be updated.

6. Enter

/E

and READR will read the first tape file to a scratch disc file, compare the tape file with the scratch disc file to verify it, purge the old disc file and rename the scratch file. READR will follow this procedure for the duration of the tape.

7. When it completes this process, it prompts:

Command ?

Enter:

/A

to terminate, pack the disc cartridge if necessary and repeat steps 1 through 7 for each tape.

8. If you run out of room, pack the disc, restart READR and specify the file number of the next file to be restored (i.e., AL:4) rather than the file name. Repeat as needed to complete the update process. Ideally, the system disc should have empty space equal to or greater than the total files to be updated. This avoids the pack requirement.

Chapter 5

Loading READR and SAVER

READR and SAVER are loaded separately from the relocatable files %READR and %SAVER. They can be loaded on-line with the LOADR program. They also need \$RSLIB, the READR/SAVER utility library. Be sure to increase its page requirement to allow room for the file name table.

LOADR commands to on-line load READR:

Dialogue	Comment
: <u>RU,LOADR</u>	
/LOADR: <u>SZ,28</u>	Override program size requirements.
/LOADR: <u>OP,LB</u>	Specify large background.
/LOADR: <u>RE,%READR</u>	Load %READR utility.
/LOADR: <u>SE,\$RSLIB</u>	Search the READR/SAVER utility library.
/LOADR: <u>EN</u>	

If you are using an RTE system with a revision date code less than 2101, you must assemble and relocate the entry point \$FREV for use with the SAVER utility. This entry point is required so that SAVER can properly handle extents with Type 1 file access. At revision date code 2101, this entry point was included within RTE File Manager and will not need to be loaded with SAVER.

For example, if your RTE File Manager is revision date code 2040, assemble this module:

```
ASMB,R,L
      NAM $FREV,7
      ENT $FREV
$FREV DEC 2040      <-- Revision code for RTE/FMGR
      END
```

and SAVER will save all files with extents properly.

Loading READR And SAVER

LOADR commands to on-line load SAVER.

Dialogue	Comment
:RU,LOADR	
/LOADR <u>SZ,28</u>	Override program size requirements.
/LOADR <u>OP,LB</u>	Specify large background.
/LOADR <u>RE,%SAVER</u>	Load SAVER utility.
/LOADR <u>SE,\$RSLIB</u>	Search the READR/SAVER utility library.
/LOADR <u>SE,%\$FREV</u>	Search for entry point \$FREV.
/LOADR <u>EN</u>	

Both READR and SAVER can be loaded as a type 2, 3, or 4 program with no SSGA required. Type 4 programs (large background) provide the largest area for file storage and therefore the largest SZ override. After they are loaded, you should save them as type 6 files with the FMGR SP command.

You should load READR and SAVER with a page size override. The excess over the program's actual size is to allow room for the file-name table. Therefore, the larger the page size, the larger the file-name table can be.

It is not recommended to generate READR and SAVER into an RTE system since there will be duplicate subroutine names created. \$RSLIB should not be generated into RTE for the same reason. Use the LOADR SE or LI command for \$RSLIB.

Appendix A

Error Messages

This appendix lists all of the error messages for the SAVER and READR programs.

SAVER Error Messages

The following is an alphabetic list of error messages and warnings produced by SAVER and explanation or recovery procedures for each message.

Some error messages report that SAVER is waiting. SAVER is waiting for you to give a system command to up an EQT or change a tape, or it could be waiting for a device to be unlocked. Strike any key to enter system breakmode. Now you can BREAK SAVER, up the EQT, provide a write ring, or place the tape on line. A BREAK will terminate SAVER, but completing the requested action allows SAVER to continue after a short time (approximately 5 seconds) delay.

Message	Explanation
Can't save FILE:SC:CR; it is a duplicate name. 0 new files. n total nnn errors found. Do you wish to continue? (Y/N)	This is just a warning message. If running from a runstring, SAVER terminates. If not, SAVER reports it found no new files, but bumps its error counter. Answer N to terminate and Y to return to the Command ? prompt.
Command xx was not recognized Use ?? to see command list and option setting.	You entered a command that SAVER did not recognize. Enter the command correctly, or enter ?? if you need help.
Directory problem @ LU nn TK tt, SC cc	An extent was found prior to a main file. The directory may be corrupt. If running interactively SAVER asks for permission to continue. Otherwise, SAVER terminates.

Error Messages

Directory verify error, SAVER aborting.

EAPOS error nnn. File not verified.

EAPOS error nnn. SAVER terminates.

EOF reached...LU xx is too short for this save. This SAVER tape is not complete.

ELOCF error nnn. File not verified.

ELOCF error nnn. SAVER terminates.

End of reel. Please mount next tape. Ready with new tape? (Yes to continue, No to stop the program).

nnn Errors found.
Do you wish to continue?

Error on EXEC call to tape,
ABREG = xxxxxxxx

ERROR...SAVER will not work with
LU xx. Change tape LU (Y/N)

SAVER terminates. The directory written to tape did not compare correctly.

nnn is the FMP error code. Positioning failed during verify.

nnn is the FMP error code. Positioning failed during save.

There is not enough tape on the minicartridge or mag tape reel to do this save. Either get a larger tape, or select less files for this tape.

nnn is the FMP error code. Reading the file pointers failed during verify.

nnn is the FMP error code. Reading the file pointers failed during save.

SAVER filled up one tape reel and now requests for the next reel. Enter Yes when you have mounted the tape.

SAVER has found errors and asks for permission to continue. NO terminates SAVER and YES returns

xxxxxxxx is the contents of the A- and B-Register at the point of suspension for a tape LU EXEC call.

You entered an illegal tape LU. (Not driver 23 or 05 or not mapped in current session). SAVER allows you to correct the mistake. N will terminate SAVER. Y will cause the following prompt to be printed:

New Tape LU is?

Error Messages

File already open, SAVER waiting. SAVER will wait for the file to be closed or for you to enter BR,SAVxx at the breakmode request. In the case of the latter, SAVER reports:

OPEN error -8 on file FILE
-- DUMMY FILE WRITTEN.

It writes that specific message on the tape in the place of the file. SAVER continues saving the remainder of the specified files.

File name:sc:cr fails to verify. Continue with next file (Y/N).

After 3 attempts, SAVER allows you to skip the unverified file to continue saving the remainder of the files.

FILE:SC:CR not purged, FMP error nnn.

Error code is the FMP error. If you do not have the capability (i.e., proper security code.) to purge the disc file, SAVER will tell you and continue purging the remainder of the files (as you direct it).

FILE:SC:CR not purged. File is on group cartridge.

You may not purge files on group cartridges unless you are group (capability of 63) or System Manager. SAVER skips purging this file and goes on to the next.

FILE:SC:CR not purged. File is on system cartridge.

You may not purge files on system cartridges unless you are System Manager. SAVER skips purging this file and goes on to the next.

LU lock on LU nn failed
system error = xxxx

LU nn was to be locked and xxxx is the contents of the A- and B-Registers at the point of suspension for an LU lock request.

LU xx is locked to another program.

SAVER terminates.

Error Messages

LU xx is not write enabled.	SAVER will wait for you to put a write ring in the mag tape, or move the record switch on the minicartridge. It will continue testing or will quit if BREAK command is issued.
Magtape LU nn is not defined or invalid.	Returns to Command ? prompt. The LU number you specified is not driver 23 or 05 or in current session. Repeat the MT command with a magtape LU number.
No files found!	No files selected to save and either /E, SZ, or LI was issued.
No files found yet.	No files selected to save and either /E, SZ, or LI was issued.
No files selected yet.	No files selected to save and either /E, SZ, or LI was issued.
No resource numbers available to lock LU xx.	SAVER terminates. Reboot your system to reclaim resource numbers. Notify your System Manager.
Note: SE,<namr> failed to find any files nn times.	The SE command returned 0 files found nn times. Informative message.
OPEN error nnn on file FILE -- DUMMY FILE WRITTEN	SAVER tried to save a file that was open to another program, so it wrote a dummy file which contains the error message to the tape to keep the directory in the proper sequence. This file cannot be restored.
RWNDF error nnn. File not verified.	nnn is the FMP error code.
RWNDF error nnn. Unable to redo file. Continue with next file (Y/N)	After trying to reverify a file, SAVER is unable to rewind the disc file. Enter Y if you want SAVER to save the remainder of the files.

Error Messages

SAVER cannot work with 16 channel MUX. This terminal has been reset to DVR00. Notify your System Manager.	See your System Manager. SAVER can not work with CTUs on 16 channel MUX (12790A).
SAVER cannot save multiple files on multiple CTU's. End of job.	SAVER terminates.
SE, requires a file name.	Re-enter SE and specify a file namr.
Sorry, you do not have the capability to purge the disc files that were saved.	SAVER goes on to the next file purging as you directed it.
Sort option must be 0-7... entry ignored.	Enter ?? for more information on sort options.
Tape error, system code = xxxx SAVER terminates.	xxxx is the A- and B-Registers at the point of suspension. An EXEC call to the tape LU failed.
Tape LU xx down. SAVER waiting. BReak or UP,eqt.	SAVER will wait until the tape EQT is brought up. Strike any key to get system breakmode. Bring the EQT up or type BR to terminate SAVER.
Tape LU not defined in your session.	SAVER terminates. See your System Manager about access to the tape LU.
Tape LU xx off line. SAVER waiting. BReak or place on line.	Bring the tape on-line. SAVER will loop back every few seconds checking to see if the LU was brought on-line. BR may be used to terminate SAVER.
Transfer file read error nnn.	nnn is the FMP error code.
Unable to open transfer file, error nnn.	nnn is the FMP error code.

Error Messages

Verify error, data miscompare.

SAVER will retry the save process up to 3 times then ask to go on to the next file. If the file is on multiple reels, SAVER allows you to retry the volume. Possible causes are bad media on tape or other hardware error or the file was changed during the save process.

Verify error, FMP nnn from next extent.

SAVER was unable to verify an extent of the file. Refer to message above.

Verify error, unexpected EOF.

Refer to the message of verify error, data miscompare. Probable cause is a corrupted directory or physical LU restores occurring while saving files.

WARNING! File name table size of nnn files exceeded! Resize the program larger if possible.

You reached the limit of file name table. Re-run SAVER and specify fewer files for this save, reload SAVER with a larger size override or use the RTE SZ command to increase SAVER's size.

READR Error Messages

The following is an alphabetic list of error messages and warnings produced by READR and an explanation or recovery procedure for each message.

Some error messages report that READR is waiting. READR is waiting for you to give a system command to bring an EQT up or change a tape, or it could be waiting for a device to be unlocked. Strike any key to get the system breakmode. Now you can Break READR or bring the EQT up. The Break will cause READR to terminate. Otherwise, READR will loop every few seconds to monitor the condition.

...message...	...explanation...
Cannot change magtape LU nn at this point.	You may not change the mag tape LU now. Terminate and re-run READR if you want to change it.
Cartridge not found.	FMGR error -032. If in file restore phase, use AL to specify a new namr or OC to alter the cartridge reference for all remaining files.
Command "xx" not recognized. Use ?? to see command list and option settings.	You entered an invalid command. Correct your mistake or if you need help, enter ??.
Compare error - data or tape length in verify.	READR terminates because of an error in verify. Possible cause is a tape unit problem or corrupted directory.
CTU LU nn not ready. READR waiting. BBreak or UP,eqt.	READR is waiting for a response or some action. Either insert the cartridge tape, or strike any key to get the system breakmode and enter BR or UP,eqt. BR will terminate READR.

Error Messages

CREAT error nnnnnn. name:sc:crn.
Enter HElp,PURge,ALter,OS,n
OC,n, or SKip this file?

Error code is the FMP error.
If running interactively,
READR allows you to recover.
See the preceding chapters for
action.

Directory read error.

READR terminates. READR en-
countered a record on tape
that is not a valid filename
or position.

Duplicate file name.

FMGR error -002. If in file
restore phase, use AL to spec-
ify a new namr, OC to change
cartridge references or SK to
skip over this file.

EAPOS error nnnnnn.

nnnnnn is the FMP error code
READR terminates.

ELOCF error nnnnnn. READR
terminates.

nnnnnn is the FMP error code
READR terminates.

End of reel. Please mount next
tape.
Ready with next tape? (YES or NO
to terminate)

This message occurs during
single file, multiple reel
saves. READR has encountered
an end of tape. It rewinds the
pending tape. Once you have
mounted the next tape, enter
YES and carriage return.

Error: Magtape record is larger
than READR's max buffer of nnnn
words.

This tape was not created by
SAVER.

Error on EXEC call to tape.
ABREG = xxxxxxxx.

xxxxxxx is the contents of
the A- and B-Register when the
error occurred.

File length mismatch on read.

READR reached an end of file
before it expected one.
Possibly a bad tape unit or
hardware problem.

Error Messages

File number out of range.	You selected a file number larger than the number of files on the tape. Try again with a different file number or select a specific file namr.
Illegal access to system disc.	FMGR error -019. You attempted to write on the system disc. Only the System Manager has the capability to write on the system disc. Enter AL to alter the file namr, or OC,n to change the cartridge reference.
Illegal file name.	FMGR error -015. Enter AL to alter the file namr.
Illegal type 0 file or file size = 0	FMGR error -019. Enter AL to alter the file namr.
LU lock for LU nn failed. system code = xxxxxxxx.	READR terminates. xxxxxxxx is the A- and B-Registers at the time of a LU lock call.
LU xx locked to another program.	READR terminates. Mag tape LU is busy.
Magtape LU nn is not defined or invalid.	Returns to Command ? prompt. The LU number you specified is invalid. Repeat the MT command with a mag tape LU number.
No files fitting search namr found on this tape.	Returns to Command ? prompt so you can specify another search namr.
Not enough room in program to store this tape directory. Reload with a larger size (SZ) parameter.	READR terminates. Reload READR with larger size parameter.
Not enough room on cartridge.	FMGR error -033. Specify another cartridge with OC,n or SK to not restore this file.
No resource numbers available to lock LU nn.	READR terminates. Reboot your system to reclaim resource numbers or notify System Manager.
READF error nnnnnn.	nnnnnn is the FMP error code.

Error Messages

READR cannot work with 16-channel MUX. This terminal has been reset to DVR00. Notify System Manager.

See your System Manager.

READR will not work with LU nnnn.

Returns to Command ? prompt.

Record size on tape (nnnn) is larger than mmmm allowed for this program.

nnnn is record size on tape, mmmm is the maximum allowed in this program. This tape was created by SAVER.

SE, requires file name.

The SE,namr command requires a file namr parameter. Refer to the discussion in Chapter 3 about SE,namr if you need help.

Security code mismatch, unable to update old file with name:sc:crn.

Returns to Command ? prompt. READR did not update the disc file with the tape file.

Tape error. ABREG = xxxxxxxx.

xxxxxxx is the contents of the A- and B-Register when the error took place.

Tape LU xx down, READR waiting. BBreak or UP,eqt.

READR will wait until the tape EQT is brought up. Strike any key to get system breakmode. Use BR to quit or bring the EQT up.

Tape off line. READR waiting. BBreak or place LU xx on line.

Bring the tape unit on line. Use BR to quit or place the tape LU on line.

This is a continuation tape for a different file. Please mount the correct tape. Ready with tape? (YES or NO to terminate).

Mount the correct tape and then enter YES when ready.

This tape is not in READR format. Recl = nnnnnn words.

Tape was not created by SAVER. READR terminates.

This is reel nn. Reel mm should have been mounted. Please mount the correct tape. Ready with tape? (YES or NO to terminate).

Mount the correct tape and then enter YES when ready.

Error Messages

This reel was created at tttt ddmmmyy which is different than the previous reel(s) ttt ddmmmyy. Please mount the correct tape. Ready with tape? (YES or NO to terminate).

TR,<LU number> not available.

Transfer file read error
FMP nnnnn.

Unable to create scratch file
file:sc:crn. Error nnnnnn.
UPDATE mode cancelled.

Unable to open transfer file,
FMP error nnnnnn.

Unable to purge file:sc:crn.
READR terminating.

Unable to purge old file,
error nnnnnn.

Unable to rename scratch file.
file:sc:crn. Error nnnnnn.

Unable to replace old file, FMP
error nnnnnn. Old file remains on
disc.

Mount the correct tape and
then enter YES when ready.

You may not specify a LU
number as the transfer desti-
nation. You must use a disc
file. Refer to the discussion
in Chapter 3 about TR,namr.

nnnnnn is the FMP error code.

nnnnnn is the FMP error code.
Returns to Command ? prompt.
If you still want to restore
this file, specify the same
search namr without specifying
UP. Override the cartridge
reference using OC,n, or when
receiving the CREAT error -2,
specify a new namr with AL. Or
else, terminate READR, purge
the scratch file, and pack the
disc. There must be enough
room to load the file.

nnnnnn is the FMP error code.

READR cannot purge the scratch
disc file in update mode.
READR terminates.

nnnnnn is the FMP error code.
READR returns to Command?

nnnnnn is the FMP error code.
Returns to Command ? prompt.

During update mode, READR
could not replace the old disc
file with the tape file. No
updating was done.

Error Messages

Unexpected beginning of tape.
READR terminating.

READR terminates. Try re-running the program. This will occur if the terminal is reset while using CTUs.

Use ?? to see command list and option settings.

You entered a command incorrectly. Enter ?? if you need help or re-enter the command.

Warning! Duplicate files on disc will be replaced in the UPDATE mode. Consider aborting READR to backup files if needed.

Simply a warning.

WRITEF error nnnnnn.

nnnnnn is the FMP error code.

Appendix B

Advanced User and Application Notes

READR and SAVER differ significantly from previous disc backup utilities by being file-oriented rather than track-oriented. A track backup utility (such as LSAVE) is dependent on the physical characteristics of the drive, but not dependent on the data content. Thus, adding a few files from an LSAVE backup to another disc LU would be difficult at best. SAVER on the other hand uses FMP calls to obtain individual files from any medium (fixed, removable, floppy disc) and without regard to any physical disc layout. By using FMP calls, independence from disc characteristics is obtained.

As a user of READR and SAVER, you may wish to change the backup techniques you are currently using to take advantage of the file selection capability with READR and SAVER. By using unique security codes for groups of related files for instance, you may save and restore just those files from or to any disc LU. You might also consider saving just type 5 files (relocatables) on one tape, and various application software sources on another. By using the SORT feature of SAVER, related program parts (i.e., source, relocatable, load file, merge file) may all be grouped together for easier handling. In this case, the 'Last 5' option should be used. In this option, the last 5 characters are sorted first, then the first character is used. This means that the source (&), relocatable (%), and command (*) files will all be together.

Remember, SAVER cannot save the RTE portion of LU 2 since it is not a file. You must backup RTE with a utility such as SAVE, LSAVE, or PSAVE. However, unless you patch or load permanent programs on LU 2 (type 6 are different than permanent programs), you will not need to save RTE again until a new system generation is switched to LU 2.

Verify Option

The VERIFY option in both READR and SAVER is set to .TRUE, for good reason. There are some media and/or hardware failures that may not be detected during the write phase. Without a bit-by-bit compare of the original data with the copy, it is not possible to determine if the copy is correct until actual use of the files begins...and this would naturally be too late. The user is encouraged to use the VERIFY option whenever the data being saved must be accurate. Consider that the tape you are making could be the last tape made before a lightning strike on the power lines.

Another feature is the automatic retry of a file that failed to verify correctly. This is done up to 3 times before SAVER terminates. READR and SAVER keep the 'window' for file changes to a minimum by opening each file one at a time and verifying the file immediately. Although some time might be saved by saving all files, rewinding and then verifying each file on a second pass, the files must remain unchanged throughout the save process. With READR and SAVER, this restriction is removed except during the actual save and verify of that file. To allow saving open files, the file is opened in shared mode during the save process. If the file is exclusively opened to another program, SAVER will issue an error message and loop every few seconds checking the file's status. SAVER can be BR'd to write a dummy file on tape, or the exclusively opened file can be closed by the user.

User Interface

READR and SAVER detect the BBreak state at every loop in the program. This allows for controlled termination at any point in the program.

Many of the questions posed by READR and SAVER are in the form (YES/NO). The YES/NO questions may be answered as a single character (Y or N) or with several characters. Trailing characters are ignored. If the question requires either Y or N then the question is repeated if some other character is entered.

To make READR and SAVER more versatile and friendly to the user, several features have been implemented.~One of these is lower case character translation. Any READR/SAVER command may be entered in lower case and understood. This includes file names, security codes, and cartridge references. This can be seen by using the batch mode with a command file. Each command from the file is echoed after translation to show the progress of the TR file.

If the /E command is missing from the runstring or from a command file, then it is implied that a /E was meant by the end of the runstring or end of file, respectively. Null commands (all spaces or several commas in a TR file or adjacent commas in a runstring) are noted as <null command> and ignored by both READR and SAVER. Note that some commands require a parameter separated by a comma (i.e., MT,8) while others require only the one command (i.e., ECHO). If the required parameter is missing in a runstring, the next item is taken as the parameter (i.e., MT,EC) and will produce an appropriate error message.

Update Mode

The user will find the UPDATE mode for READR somewhat different than previous utilities. READR will never replace an old file until several steps have been completed successfully. These are:

- 1) The file has been loaded onto the requested disc LU with a temporary name using the CRETS call.
- 2) The file is verified successfully.
- 3) Then the old file is purged only if the user gave the correct security code in an OC command, or the security code on tape matches the file being replaced.

If any of the items above fail, the old file is left unchanged. Since additional space is needed to hold the temporary file, a complete update of all files will require the disc LU to have approximately twice as much free space as the files being updated. When this is a problem, the user may restore files individually by specifying a file number (from the directory listing) and then stopping READR when a PK command is needed. Remember that disc space left by a purged file is not reused unless the file being created is exactly the same size.

File Space

SAVER does not actually read the file sequentially. Instead, the files are opened in type 1 access mode. This means that the individual records are left in their 'native' state. For variable length records, the length word, the data and the trailing length word are saved as a unit. The effect of this technique is to save all disc space requested by the directory entries even though the last extent may not be full. Thus, a restored file (where the original had extents) will have no extents (always true with READR) but with a file size that may be longer than necessary. However, a simple transfer or edit of the file can remove the extra blocks. The user need not be concerned about the extra space. It was there in the original file and merely appears in a different form (no extents) in the restored file.

Tape Utilization

SAVER saves files so that a physical record on tape may contain many logical records. This is done for efficient utilization of tape. The typical FMGR command to STore a file on tape creates records exactly as long as the original (variable length). This is typically 5 to 20 words or 10-40 bytes. At 800 bytes per inch (magnetic tape) this would be 1/80 to 1/20 of an inch to store the records. However, every record requires an inter-record gap of 2/3 inch. If all records were 10 bytes in size, only 2% of the tape will contain data. Even at 80 bytes (1/10 inch), the utilization is still only 20%. It is apparent that the longer the record (for tape), the better the tape usage.

SAVER makes the best use of tape by writing 4096 byte blocks whenever possible. This works out to about 90 to 95% tape utilization without approaching the limit for error detectability. CTUs in the terminal are similarly more efficient but are limited to 256 byte records due to terminal firmware constraints. However, SAVER comes very close to the 110,000 byte storage capacity on a CTU minicartridge.

SAVER predicts tape utilization based on nominal physical adjustments for the 3 tape formats (800/1600 bpi magnetic tapes and 800 bpi CTUs). CTUs differ from magnetic tapes in that only a one track record head is used. Thus, 800 bpi for CTUs is only 1/8 of the same data capacity for 9 track tape drives. The following is a summary of the tape usage computations used in SAVER:

ITEM	800	1600	CTU
-----	-----	-----	-----
BOT to first data	3.0000	7.0000	3.0000 inches
Each data byte	.0012	.0006	.0100
Inter-record gap	.6200	.6700	.8800
Inter-file gap	5.5000	3.0000	3.5000

For example, a 256 byte record would require .307" for data at 800 bpi, .154" at 1600 bpi and 2.56" on a CTU. By adding the inter-record gap, the final results for a single record save are .927" for 800, .824" for 1600 and 3.44" for a CTU.

The table shows that separating records and files is indeed costly. The larger the record, the smaller the effect of this overhead. These values are Industry standard for magnetic tapes but are subject to some tolerances allowed within the ANSI standard. In addition, if a tape error is detected by the driver during a write, the tape will be backspaced to the beginning of the record, then an erase forward of 4 inches is performed and the record rewritten in the new area. Since this may take place up to 10 times, an inter-record gap could be 40 inches long without SAVER knowing this fact. The tape would still be readable even with this long gap.

Tape Format

The actual tape format is given below. The first file is always the directory, followed by 1 to n files. The first directory record is a title and will be 80 bytes long (pre-release versions of SAVER may have slightly shorter records but these are compatible with READR). The header and the directory may be read using FMGR commands (i.e., LI, ST, DU) and for CTUs, listed in LOCAL by the terminal's READ key. The header record contains the date and time that SAVER started the job, the number of files and number of blocks needed to fully restore the files on tape, and finally the block size and reel number. Each directory entry is a file name and numeric position in the file. The directory is terminated by 1 file mark.

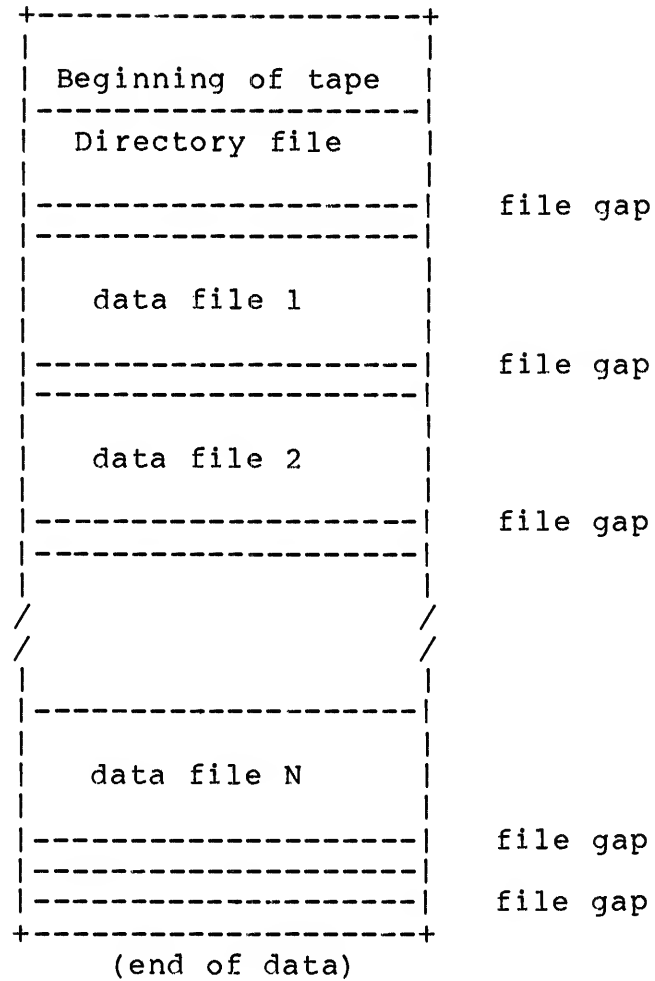
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..... (bytes)				
Start	Finish	Length	Contents	
-----	-----	-----	-----	-----
-Directory Header				
1	1	1	Blank	
2	16	15	Text: <<RTE FILE SAVE	
17	17	1	Blank	
18	21	4	Time of Save (HHMM format)	
22	22	1	Blank	
23	29	7	Date of Save (DDMMYY format)	
30	30	1	Period	
31	36	6	Number of files on tape	
37	37	1	Blank	
38	43	6	Text: FILES.	
44	50	7	Number of blocks (128 words) needed to restore all files on the tape.	
51	51	1	Period	
52	57	6	Text: BLOCKS	
58	59	2	2 blanks	
60	61	2	Text: R=	
62	65	4	Max block size on tape in words	
66	68	3	Period and 2 blanks	
69	73	5	Text: REEL=	
74	76	3	Reel number	
77	78	2	Text: >>	
79	79	1	Revision level for SAVER	
80	80	1	Text: >	
-Directory entry:				
1	6	6	File position on tape (0=directory)	
7	7	1	Blank	
8	13	6	File name (6 characters)	
14	14	1	Colon	
15	20	6	Security code	
21	21	1	Colon	
22	27	6	Cartridge Reference number	
28	28	1	Colon	
29	34	6	File type	
35	35	1	Colon	
36	41	6	File size (+blocks, -chunks)	
42	42	1	Colon	
43	48	6	Record size (Type 2 files)	
49	80	32	Blanks	

Each file has 1 directory entry. The directory is terminated with a file mark (tapemark). Next, the actual file is stored. For CTUs, all blocks will be 256 bytes. For magnetic tapes, the blocksize is 4096 bytes unless the rest of the file is less than 4096 bytes. Then the record size will be a multiple of 256 bytes.

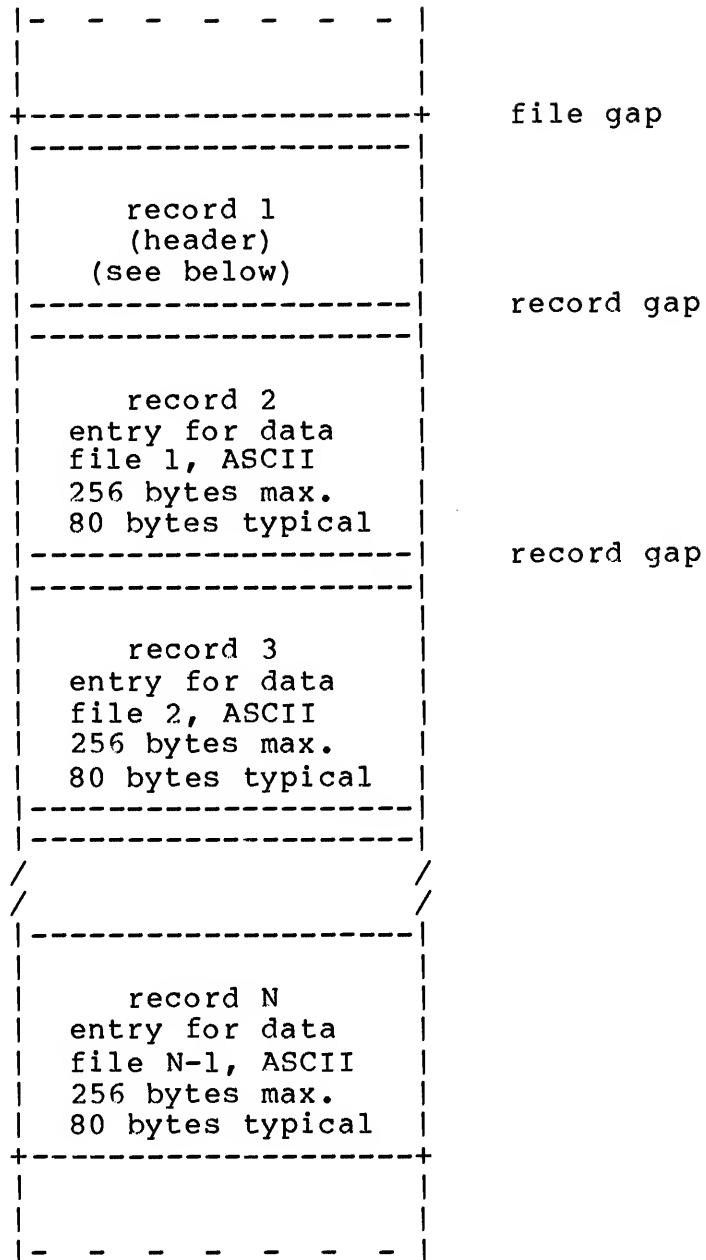
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The format of the tape used by the READR/SAVER programs follows:



Advanced User And Application Notes

Format of the directory file is as follows:



Record 1 is the Header record of ASCII 80 bytes. It contains the time of creation of the tape, the number of files on the tape, the total number of RTE blocks (128 words) in all the files, the record length in words for the packed data file records, and the reel number.

To give users of non-RTE-IVB systems usage of SAVER tapes, the following program will run on any RTE2/3/4A, RTE-L/XL, or RTE-A system with an 8K partition. It does no error checking at all, but will read any READR tape. The user must manually position the tape to the desired file. If file n is desired, then n file-forward (CN,lu,FF) commands must be given. (Tape starts at bottom.)

FTN4,L

```

PROGRAM GETRS(3,99),GET FILE FROM READR/SAVER TAPE REV.2012
C
C-----
C  THIS PROGRAM WILL READ ANY FILE FROM A TAPE WHICH IS IN THE
C  READR/SAVER FORMAT. IT IS A QUICK AND DIRTY WAY JUST TO GET
C  READER OFF THE TAPE TO GET THE REST OF THE FILES.  THINK OF
C  IT AS A BOOTSTRAP.  IT DOES NO ERROR CHECKING AT ALL.
C-----
C
C FIRST POSITION TAPE TO BEGINNING OF FILE WITH CN REQUESTS, THEN
C RUN WITH --> RU,GETRS,MT,BL,TYPE
C
C MT IS THE LU OF THE MAGNETIC TAPE OR MINICARTRIDGE
C BL IS THE NUMBER OF BLOCKS IN THE FILE, AS SHOWN IN THE
C DIRECTORY AT THE FRONT OF THE TAPE.
C TYPE IS THE FILE TYPE TO BE CREATED (MUST MATCH ORIGINAL FILE)
C
C !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
C !! TAPE MUST BE MANUALLY POSITIONED TO THE START OF THE FILE !!
C !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
C ALSO, FILE WILL ALWAYS BE NAMED "*****". MUST RENAME AS NEEDED.
C
C      DIMENSION IBUF(2048),IDCB(144),IP(5),ISIZE(2)
C
C PICK UP TAPE LU, FILE SIZE
C
C      CALL RMPAR(IP)
C      ISIZE(1)=IP(2)
C      ISIZE(2)=0
C      MT=IOR(100B,IP(1))
C      IF(IP(3).EQ.0) IP(3)=5
C
C TRY TO CREATE A FILE TO HOLD IT
C
C      CALL PURGE(IDCB,IERR,6H*****)
C      CALL CREAT(IDCB,IERR,6H*****,ISIZE,IP(3))
C
C FORCE TO TYPE 1 FILE
C
C      IDCB(3)=1
C

```

Advanced User And Application Notes

```
C READ THE TAPE
C
      DO 100 I=1,1000
      CALL EXEC(1,MT,IBUF,2048)
      CALL ABREG(IA,LEN)
      IF(LEN.EQ.0)GO TO 9000
C
C WRITE THE DATA TO THE FILE
C
      CALL WRITF(IDCIB,IERR,IBUF,LEN)
100 CONTINUE
C
C CLOSE THE FILE
C
9000 CALL CLOSE(IDCIB)
      CALL EXEC(2,1,20HFILE ***** CREATED.,-20)
      END
```

Cartridge Tapes

The CTUs need some special considerations in that they are part of a subsystem (terminal, CTUs and possibly a printer or HPIB device). When the terminal is used for special purpose editing (such as EDIT/1000 or forms mode), internal straps are set or cleared as needed by the application. When CTUs are used, these straps may create an error condition for CTU operation. To overcome this problem, SAVER and READR both configure the straps as normally needed for proper CTU operation. The driver is asked to update status so that the terminal and driver match states. The update status call is not compatible with the 16-channel multiplexer driver and will reset the driver to type 00. SAVER and READR are therefore not compatible with the older MUX product.

Terminals also treat the CTUs differently at a record length of 256 bytes. Therefore, a tape retry may cause a record to be recorded which places the terminal in an 'I/O ERROR A' state when reading back. The tape should be re-recorded and if the error repeats, the tape should not be used for SAVER files. This applies to any program using 256-byte records. In addition, the data recorded in type 1 access will contain binary data and the Std Async Datacomm interface (02640-60086) will not support the CTU with binary data at high baud rates. Either the GP Async interface (02640-60089) may be used at 4800 baud or the Enhanced Datacomm interface (02640-60239) may be used at any baud rate.

File Access Rights

Extended files (files using double integer record numbers) are restored as extended files (size = -chunks). File access is controlled by the level of the user's login rights. If the user is not a group manager (i.e., level 63), files on group or system mounted LUs may not be purged by SAVER's purge phase, and read-only files (negative security codes) on group or system cartridges may not be saved at all. Only the System Manager can save or update files stored on system cartridges where the files are read-only. If the user does not have purge rights to files saved from a given disc LU, the security codes are not saved on the directory (i.e., set to zero).

File Comments

One of the useful techniques in documenting a file save tape is to make the TR file the first file saved on tape, and to include numerous comments in the TR file. This way, load instructions, application info and operations notes can become part of the save tape. If the tape directory is to be sorted, be sure that the TR file has a name that places it first in the sort sequence. In ASCII, the ! and " come before every other file naming character. If a sort on the last 5 characters is done, name the file ""INDX or similar name that will place the file at the beginning. Be sure that the TR file selects itself too. The following is an example of a TR file with comments for documentation.

```
*
* index to programs
*
SE,""INDX::SP
*
* Database save...3/22/81, updated as of 3PM
*
SE,-DATCP::DB
*
* Load the following programs with SSGA access
*
SE,-DS---::DS
/E
```

Advanced User And Application Notes

One last note about runstrings. The NO option may not be used as the first parameter. RTE considers RU,SAVER,NO VE as a schedule NOW option and throws away the first parameter up to the next comma. To avoid this problem, use NOT VE or place NO VE as some parameter other than the first. This could even be done by using 2 commas following the program name. SAVER and READR ignore adjacent commas and RTE will not absorb any data beyond the second comma.

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The READR program has two major phases, the first of which is an interactive definition phase, where the user defines the way that READR is to retrieve the files. At the end of this phase, a directory is read from the tape and stored in a table in memory. The second phase is the restore phase. READR uses the directory in memory to position the tape and read files from the tape and store them on disc. This phase can be run interactively or in a batch mode.

Table of interactive commands.

/A	ABORT This command is used to abort the program.
VE	VERIFY This is a command to disable the verify of the tape. READR will do a complete verify of all files unless this command is given.
MT,n	MAG TAPE LU CHANGE The default LU for the tape is 8. This command allows the user to select some other value, which can be the LU of either a 7970 drive or one of the mini-cartridge LU's on a 264X terminal. Note that READR does not support the use of the mini-cartridge drives on a multi-point terminal, as they do not have independent RTE LU's.
TT	Terminal Type This parameter selects the manner in which output to the terminal is done. The default mode is CRT mode. In this mode, much of the output to the terminal is done without a linefeed at the end of the line. The other mode of terminal output is hardcopy. This mode does linefeed at the end of the line.
LI	LIST files This command causes the tape directory to be listed to your terminal as the directory is read. Default is no list. This useful if the directory is short. If it is too long to fit on the crt screen, the first file can simply be listed to a printer by the FMGR, as the first file is in 'dump' format. (it is the only one which is listable.)
ALL	ALL files mode This parameter indicates that you wish to restore all the files on the tape to disc. This mode is not interactive.
UP	UPDATE mode The normal mode of operation of READR is to merge files from the tape with files already present in the system. In this mode, if READR encounters an error when it attempts to restore a file (such as duplicate file name, FMP -2), it simply reports the error, skips the file on the tape and tries the next one. The assumption in this mode is that the files on the tape are older than the ones on disc. This is the mode which is best when restoring a back-up tape. If the files on tape are more recent, for instance updated software, then you would want the files on tape to take precedence over the ones on disc. The UPdate command allows this method of file retrieval. In this mode, if a file already exists on disc which has the same name as a file that READR is attempting to restore, READR will create a scratch file, restore and verify the file, then purge the old file and rename the scratch file, -- but only if no errors on verify! --.
EO	ECHO This parameter is used to enable the echoing of the tape position as READR seeks files on the tape. This is done to prevent that 'what is it doing now?' feeling. Default is echo enabled.
OC,n	Override Cartridge number This flag is used specify that the files be restored to a different cartridge reference number than the one they were saved with. This is especially needed when transporting files from one system to another, as the two systems may not have any C.R.N.'s in common. The numeric parameter may be either positive for C.R.N. or negative for disc LU or zero to use any disc with enough room for the file. If OC is entered without a parameter following it, it cancels the cartridge override and the files will again be restored to the

values given on the tape.

OS,n Override Security code
 This command is used to override the security code the files had when they were saved. This allows for easy transportability also. The numeric parameter can be pos., neg., or zero. If no parameter is given, security code override is cancelled.

/E END of definition phase
 This command is used to leave the interactive definition phase. When this command is given, READR will read the first file on the tape to build the in memory directory.

READR can also get it's commands from the run string which scheduled the program. For example, RU,READR,OC,5,MT,22,ALL would cause the program to restore all the files on the tape on LU 22 to a disc which has cartridge reference number 5.

This has the possibility of restoring groups of files with no operator intervention.

For all of the interactive commands the effect of the command can be canceled by re-issuing the command. For example, if you type VE which would disable tape verify, entering VE again will re-enable the verify. The action of the commands is to toggle the state of the program flags.

FILE RESTORE PHASE

The first thing that READR does when it enters the restore phase is to print the header record from the directory on the tape. This record has the time that the save was done, the number of files on the tape, the total number of blocks in all the files and the record size in words of the tape records.

If LI was specified, this will be followed by a listing of the NAMRs of the files on the tape.

For an interactive run, READR then prints:

1 NAMR of file to retrieve ('--' to end)?
 the number is the number of the file at the current tape position, READR is expecting a NAMR of a file to retrieve. It will use the name, security code, and cartridge fields to search the directory in memory. If no file is found with that NAMR, the message 'File not found on this tape.' is given. If the name is found, and it can be restored to disc, READR will position the tape forward or backward as needed and read the file onto disc. It then does a verify unless the user issued the VE command. In the interactive mode, if READR encounters a problem in trying to create the new file name (assuming UP was not selected), it will print:
 CREAT error xxx. Purge, ALter, OC, OS, or IGnore?
 The error is the FMP error code returned by the create call. READR is waiting for instructions to overcome the error. The PU command will purge a duplicate file if one exists and then restore the file. The AL command will print the NAMR that READR is trying to create and then allow the user to input a new NAMR to try. This is a temporary change for the current file only. The user needs only input the subparameters that are to be changed. For example, given '::BB', READR would change the cartridge number without affecting the name or security code parameters. The OC and OS commands allow a permanent alteration of the security code and cartridge numbers for all the remaining files (see OC and OS above). The last option, IGnore, does just that, going back to the prompt for a file NAMR.

If '--' is entered, READR will return to phase one of the program.

If a zero length record (control D for DVR00 devices, or carriage return with no other input for DVR05 devices) is input, READR asks:

'Do you wish to quit?'; any response other than NO is taken as affirmative (including zero length read).

Format of the tape used by the READER/SAVER programs:

EDT

Directory file

```

|
=== file gap

```

data file 1

```
=== file gap
```

data file 2

```

===== file gap

```

etc.

data file N

```

1
=== file gap

```

```

===== file gap (9TRK) or EOVD marker (CTU)

```

Format of the directory file:

```
=== file gap
```

record 1, Header record, ASCII 68 bytes, containing the time of creation of the tape, number of files on the tape, total number of RTE blocks (128wds/256bytes) in all the files, and the record length (wds) for the packed data file records.

--- record gap

record 2, File entry, ASCII 46 bytes, containing an index number (1 to N), and the RTE NAMR of the data file. The order of the file entry NAMR's is the same as the order of the data files on the tape.

--- record gap

etc.

record N, entry for data file N

=== file gap

Format of a typical data file:

=== file gap

record 1. 1024wds

data records are images of the disc sectors packed 8 sectors per record for a total of 1024 words per record. The last record will be whatever size is needed to contain the remainder of the file when 1024 word blocks are not needed.

```

-- record gap

```

record 2, 1024wds

The record size will always be a multiple of 128 words, as only whole sectors are saved, even if the file logically ends in the middle of a sector. The minimum size of a data file is a single record, 128 words long.

--- record gap

Of course, since the mini-cartridges have a maximum record size of 128 words, all records will be 128 words.

etc.

The records on the tape are exact images of the disc sections and so for tune 3 and above

--- record-gap files will contain the RTE record lengths and all other internal structures, including zero length records. This makes the restore operation very efficient.

 final record,
 128 to 1024 words.

=== file gap

The SAVER program has three major phases, the first of which is an interactive search phase, where a file name table is built in memory containing the names of the files that are to be saved in the second phase. The file is built by searching the FMP file directory. The basic mechanism is for the user to specify a mask NAMR which the program uses to find files and add to the table. The mask usage is very similar in operation to the mask used in FMGR's DL command.

The second phase writes the file name table to the tape as a directory, then opens each file in turn and writes it to the tape in a packed format. When all of the files are saved, the tape is re-wound and, unless the user inhibits it, the files are compared word for word with the images on tape. Note that the files cannot change during this process, so open files cannot be saved and verified correctly.

The third and final phase is an optional purge phase where the files can be purged from disc to release disc space.

Table of interactive commands.

/A ABORT
 This command is used to abort the program.

VE Verify
 This is a command to disable the verify of the tape. SAVER will do a complete verify of the tape directory and all files unless this comand is given.

MT,1 MAG TAPE LU CHANGE
 The default LU for the tape is 8. This command allows the user to select some other value, which can be the LU of either a 7970 drive or one of the mini-cartridge LU's on a 264X terminal. Note that SAVER does not support the use of the mini-cartridge drives on a multi-point terminal, as they do not have independent RTE LU's.

TT Terminal Type
 This parameter selects the manner in which output to the terminal is done. The default mode is CRT mode. In this mode, much of the output to the terminal is done without a linefeed at the end of the line. The other mode of terminal output is hardcopy. This mode does linefeed at the end of the line.

T6 Type 6
 This parameter is used to enable saving type 6 files. The default is to not save type 6 files, as they are not transportable from system to system. Additionally, SAVER never attempts to save type 0 files.

EC ECHO
 This parameter is used to enable the echoing of the file searches to the user. The default is no echo.

SE SEARCH
 The format of the search command is SE,FINAM:SC:CR:TY:UMSC.
 This is a special use of the RTE NAMR format, where the parameters have the following uses:
 FINAM --- file name, 0 to 6 characters long, where each character follows the RTE file naming conventions as given in the FMGR documentation, with the exception that any character position can be held by a '-' to denote that this position is a don't care position in the file name comparison.
 If no name is given (:sc:cr for example), it is equivalent to a name of '-----'.
 SC --- security code, two alphanumeric characters or a number, either decimal or octal. If a security code is given, then the absolute value of that code will be compared to the absolute value of each file to determine if the file is to be saved. If no security code is given (name:cr for example), then all security codes will

be accepted. Note that for systems other than RTE-IVb, the system master security code must be given as the 4th parameter to allow saving non-specified security codes.

CR --- cartridge reference, if positive will restrict files to the disc with the given cartridge reference number. If negative the LU of the disc will be used as the mask. If CR not given, or if zero, all discs will be accepted.

UMSC --- see security code definition.

PU PURGE

The purge flag is set by this command. No immediate action occurs as this is a flag to enter the purge mode after the files are saved to tape. Note that the purge mode will not be entered if SAVER is not running interactively, if there were errors detected during the verify phase, or if tape verify was disabled.

TR,NAMR

SAVER can transfer to a file containing commands. The format of the commands is the same as if they were being entered by the user. A line in the transfer file starting with '*' will be ignored, to allow for documentation.

The format of the command is TR,NAMR. The end of the file is an implied /E command, and TR with no NAMR is an implied TR,1.

This has the possibility of saving groups of files with no operator intervention. NOTE!, the command file itself cannot be one of the files saved as it will be open during the search phase!

Also, Command files cannot be stacked.

/E END OF SEARCH

This command is used to leave the interactive search phase and go on to the file save phase.

SAVER can also get it's commands from a run string which scheduled the program. For example, RU,SAVER,SE,SAVER::BB,/E would cause the program to find files such as %SAVER and %SAVER on disc BB and save them, to LU 8, doing a verify.

For all of the interactive commands, except search, the effect of the command can be canceled by re-issuing the command. For example, if you type VE which would disable tape verify, entering VE again will re-enable the verify. The action of the commands is to toggle the state of the program flags.

FILE SAVE PHASE

SAVER computes an estimate of the length of the tape needed to save the files and asks permission to continue. If 'NO' is entered, the program will terminate. Default is 'YES'.

If running under control of a run string, the question is rhetorical, as the program will not wait for permission before proceeding.

After this, SAVER is not interactive during this phase, so the only way to command it to do anything is to set the attention flag (BR,SAVER) which causes the program to terminate.

FILE PURGE PHASE (optional)

The purge prompt is "Purge files (NO, SOME or ALL)?"

If you enter 'NO', the program terminates.

If you enter 'ALL', the program will then ask "Are you sure you want to do this?". Any answer other than 'YES' will be taken as a 'NO' response and the program will go back to the purge prompt.

If you enter 'YES', the program will purge all the files that were saved to tape. You can set the break flag (BR,SAVER) to abort.

If you enter 'SOME', the program will then ask for each file if it is to purge that file, skip it, or terminate the program.

READER COMMENT SHEET

READR/SAVER UTILITY Reference Manual

92068-90016

July 1982

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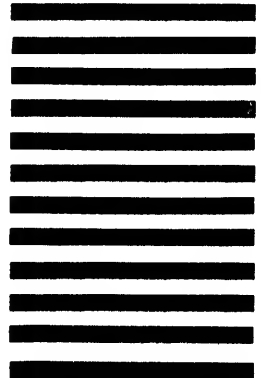
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